

PB87-155230

Pesticide Fact Sheet Number 115: Aldoxycarb

(U.S.) Environmental Protection Agency
Washington, DC

16 Jan 86



U.S. Department of Commerce
National Technical Information Service

NTIS

REPORT DOCUMENTATION PAGE		1. REPORT NO.	2.	3. PB87-155230
4. Title and Subtitle EPA Pesticide Fact Sheets - ALDOXYCARB No. 115			5. Report Date Issued 1/16/86	
7. Author(s) EPA, Office of Pesticide Programs, Registration Division			8. Performing Organization Rept. No. 540/FS-87- 149	
9. Performing Organization Name and Address US Environmental Protection Agency Office of Pesticide Programs Registration Division, TS-767C 401 M Street, S.W. Washington, D.C. 20460			10. Project/Task/Work Unit No.	
12. Sponsoring Organization Name and Address Same as #9			11. Contract(C) or Grant(G) No. (C) (G)	
			13. Type of Report & Period Covered	
			14.	
15. Supplementary Notes				
16. Abstract (Limit: 200 words) This document contains up- summary of the Agency's regulat pesticide or group of pesticides. the following actions has occurred. e chemical information, including a ition and rationale, on a specific ct Sheet is issued after one of 1. Issuance or reissuance of a registration standard, 2. Issuance of each special review document, 3. Registration of a significantly changed use pattern, 4. Registration of a new chemical, or 5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.				
17. Document Analysis a. Descriptors Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings b. Identifiers/Open-Ended Terms REPRODUCED BY U.S. DEPARTMENT OF COMMERCE NATIONAL TECHNICAL INFORMATION SERVICE SPRINGFIELD, VA 22161 c. COSATI Field/Group				
18. Availability Statement: Publicly Available		19. Security Class (This Report) Unclassified		21. No. of Pages 5
		20. Security Class (This Page) Unclassified		22. Price



Pesticide Fact Sheet

Name of Chemical: Aldoxycarb

Reason for Issuance: New Chemical Registration

Date Issued: January 16, 1986

Fact Sheet Number: 115

1. DESCRIPTION OF CHEMICAL

Generic Name: 2-methyl-2-(methylsulfonyl)propanal-O-(methylamino carbonyl oximel)

Common Name: Aldoxycarb

Trade Name: Standak

Other Names: Sulfocarb, Aldicarb sulfone

EPA Shaughnessy Code: 110801

Chemical Abstracts Service (CAS) Number: 1646-88-4

Year of Initial Registration: 1986

Pesticide Type: Insecticide/Nematicide

Chemical Family: Carbamate

U.S. Producer: Union Carbide Agricultural Products Co., Inc.
No other producer at this time

2. USE PATTERNS AND FORMULATIONS

Application Sites: Containerized honey locust trees
(Commercial Use Only) to control honey
locust gall midge

Type of Formulations: Insecticide/fertilizer spike; registered
to International Spike, Inc.

Method of Application: Spike is inserted into soil in
container

Application Rate: One or more spikes of 1% active ingredient
per container, depending on size of container
or plant.

Usual Carriers: Formulation is a pressed mixture of aldoxycarb
and fertilizer chemicals.

3. SCIENCE FINDINGS

Summary Science Statement

Technical aldoxycarb has high mammalian acute toxicity. It has not been shown to cause oncogenic, mutagenic, teratogenic, delayed neurotoxin or reproduction effects. Aldoxycarb is a known degradate/metabolite of aldicarb produced by the oxidation of the thio-moiety.

Sufficient data are available to characterize aldoxycarb from an environmental fate and ecological standpoint. Aldoxycarb is extremely toxic to wildlife. Use precautions are being imposed to reduce potential hazards. Although aldoxycarb has the potential to contaminate groundwater under certain environmental conditions, the proposed containerized plant use will preclude any measurable contamination.

A tolerance assessment is not needed because the registered use pattern is for an ornamental plant. There are no data gaps.

Chemical Characteristics of Technical Aldoxycarb

Physical State: Crystalline powder at 20°C

Color: White

Odor: Slightly sulfurous

Melting Point: 140-142° C

Vapor Pressure: 9×10^{-5} mm Hg at 25° C

Density: 1.35 g/cm³ at 20° C

ph: 3-6

Toxicology Characteristics of Technical Aldoxycarb

Acute oral: 21.4 mg/kg, Toxicity Category I

Acute dermal: 1000 mg/kg, Toxicity Category II

Primary Dermal Irritation: No irritation, Toxicity Category III

Primary Eye Irritation: No irritation, Toxicity Category IV

Acute Inhalation: 0.209 mg/l, Toxicity Category II.

Neurotoxicity: Not an acute delayed neurotoxic agent at doses up to 250 mg/kg (highest dose tested (HDT)).

Oncogenicity: Two studies, rat and mouse. Both are acceptable and are negative for oncogenic effects up to 9.6 mg/kg/day (HDT).

Teratogenicity: Two teratology studies, rat and rabbit have been evaluated to determine the teratogenic potential of aldoxycarb. Both studies were negative for teratogenic effects at levels up to 9.6 mg/kg (HDT).

Reproduction/3-generation: No effects on reproduction at levels up to 9.6 mg/kg (HDT).

Metabolism: The metabolism of aldoxycarb is adequately understood. It is metabolized by hydrolysis of the carbamate ester to form the oxime. Other reactions of the oxime occur.

Mutagenicity: Adequate studies are available to demonstrate aldoxycarb is not a mutagen.

Physiological and Biochemical Behavioral Characteristics

Mechanism of Pesticidal Action: A systemic insecticide/nematicide which causes reversible carbamylation of the acetylcholinesterase enzyme of tissues, allowing accumulation of acetylcholine at cholinergic neuroeffector junctions (muscarinic effects) and at skeletal muscle myoneural junctions and in autonomic ganglia (nicotinic effects). The central nervous system is also impaired.

Symptoms of poisoning include: headache, dizziness, weakness, ataxia, pinpoint pupils, blurred or dark vision, muscle twitching, nausea, vomiting, diarrhea, convulsions and death. The onset of these symptoms is rapid and their severity depends on the dose. The immediate cause of death is usually respiratory failure.

Metabolism and Persistence in Plants and Animals:

Acceptable studies have been submitted which show aldoxycarb is metabolized in plants and animals by hydrolysis of the carbamate ester to form the oxime. Further reactions of the oxime yield aldoxycarb aldehyde, aldoxycarb alcohol, aldoxycarb acid and aldoxycarb nitrile. The oxime and alcohol metabolites are easily conjugated to form water soluble glycosides, sulfates, and other compounds.

Environmental Characteristics

In soil and water, aldoxycarb is very stable under acidic conditions, stable at neutral conditions and very unstable to hydrolysis at alkaline conditions. It is rapidly hydrolyzed to sulfocarb oxime which in turn rapidly degrades to methane sulfonic acid and 2-hydroxy isobutyraldehyde oxime. Aldoxycarb is rapidly degraded to a variety of materials under both aerobic and anerobic conditions. In certain soils, such as those with a sandy loam texture, it has a half-life of 2-4 weeks. Aldoxycarb is mobile in certain soil types and does have the potential to contaminate groundwater under certain situations. Soil types of high sand content and organic matter will promote leaching of parent and degradation products, which are of lower toxicity than that of the parent compound.

However, it is believed the containerized ornamental plant use will not result in groundwater contamination because of the fact that application is made to soils in containers.

Ecological Effects of Technical Aldoxycarb

Avian oral: Mallard duck - 33.5 mg/kg

Avian dietary: Waterfowl species (Mallard duck) - >10,000 ppm
Upland game species (Bobwhite quail) - 5,706 ppm

Freshwater fish: Coldwater species (rainbow trout) - 42.0 ppm
Warmwater species (bluegill sunfish) - 53.0 ppm

Acute Freshwater Invertebrates: Daphnia - 0.176 ppb

Precautionary language would be required for outdoor terrestrial use for hazards to wildlife.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

The Agency has determined to register aldoxycarb for containerized ornamental plants because, adequate studies are available to assess the toxicological and environmental characteristics of aldoxycarb and its potential effects to humans from this use. The Agency concludes from this studies that this use pattern will not pose any unreasonable adverse effects to humans or the environment. None of the criteria for unreasonable adverse effects listed in section 162.11(a) of Title 40 of the U.S. Code of Federal Regulations have been met or exceeded for this use.

5. SUMMARY OF MAJOR DATA GAPS

There are no data gaps.

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